

The invention claimed is:

1. A method for doping silica soot with fluorine during laydown, comprising the steps of:
  - 5 providing a bait rod;
  - providing a burner, the burner emitting a reactant flame;
  - providing at least one first gas-feed separated from the burner, the gas-feed supplying a first jet of fluorine based gases;
  - depositing a layer of silica soot on the bait rod by vaporizing a silica producing gas within the reactant flame of the burner; and
  - 10 supplying the first jet of fluorine-based gases to the silica soot deposited onto the bait rod via the first gas-feed subsequent to vaporizing at least a portion of the silica producing gas within the reactant flame of the burner.
- 15 2. The method of claim 1, wherein the first jet of fluorine supplying step includes directing the first jet of fluorine-based gases such that the first jet of fluorine-based gases does not contact the silica soot prior to the silica soot being deposited onto the bait rod.
- 20 3. The method of claim 2, wherein the first jet of fluorine is directed substantially orthogonal to the bait rod.
4. The method of claim 3, and further including:
  - providing at least one second gas feed juxtaposed across the burner from the
  - 25 first gas-feed, the second gas-feed supplying a second jet of fluorine-based gases; and
  - supplying the second jet of fluorine-based gases to the silica soot deposited onto the bait rod via the second gas-feed subsequent to vaporizing at least a portion of the silica producing gas within the reactant flame of the burner.
- 30 5. The method of claim 4, wherein the second jet of fluorine supplying step includes directing the second jet of fluorine-based gases such that the second jet of

fluorine-based gases does not contact the silica soot prior to the silica soot being deposited onto the bait rod.

6. The method of claim 5, wherein the fluorine-based gases include  $\text{SF}_6$ .

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7. The method of claim 1, wherein the fluorine supplying step includes directing the first jet of fluorine-based gases such that the first jet of fluorine-based gases contacts the silica soot prior to the silica soot contacting the bait rod.

10 8. The method of claim 7, and further including:  
 providing at least one second gas-feed juxtaposed across the burner from the  
 first gas-feed, the second gas-feed supplying a jet of fluorine-based gases; and  
 supplying the second jet of fluorine-based gases to the silica soot deposited onto  
 the bait rod via the gas-feed subsequent to vaporizing at least a portion of the silica  
 15 producing gas within the reactant flame of the burner.

9. The method of claim 8, wherein the second jet of fluorine supplying step  
 includes directing the second jet of fluorine-based gases such that the second jet of  
 fluorine-based gases contacts the silica soot prior to the silica soot contacting the bait  
 20 rod.

10. The method of claim 9, wherein the fluorine-based gases include  $\text{SF}_6$ .

11. The method of claim 1, and further including:  
 25 providing at least one second gas feed juxtaposed across the burner from the  
 first gas-feed, the second gas-feed supplying a second jet of fluorine-based gases; and  
 supplying the second jet of fluorine-based gases to the silica soot deposited onto  
 the bait rod via the second gas-feed subsequent to vaporizing at least a portion of the  
 silica producing gas within the reactant flame of the burner.

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12. The method of claim 1, wherein the fluorine-based gases include  $\text{SF}_6$ .

13. The method of claim 1, wherein the reactant flame is produced from a compound containing hydrogen.

14. An apparatus for doping silica soot with fluorine during the formation of an optical fiber, comprising:

a burner adapted to emit a reactant flame to vaporize a silica producing gas; and at least one first gas-feed separated from the burner, the gas-feed adapted to supply a first jet of fluorine-based gases; and

wherein the reactant flame emitted from the burner is used to vaporize the silica producing gas thereby creating a silica soot which is deposited on a bait rod, and wherein the first gas-feed is oriented such that the first jet of fluorine-based gases contact the silica soot subsequent to at least a portion of the silica producing gas being vaporized within the reactant flame of the burner.

15. The apparatus of claim 14, wherein the first gas-feed is oriented such that the first jet of fluorine-based gases does not contact the silica soot prior to the silica soot being deposited on the bait rod.

16. The apparatus of claim 15, wherein the first gas-feed is oriented such that the first jet of fluorine is directed substantially orthogonal to the bait road.

17. The apparatus of claim 16, further including:

at least one second gas-feed juxtaposed across the burner from the first gas-feed, the second gas feed adapted to supply a second jet of fluorine-based gases; and

wherein the second gas-feed is oriented such that the second jet of fluorine-based gases contact the silica soot subsequent to at least a portion of the silica producing gas being vaporized within the reactant flame of the burner.

18. The apparatus of claim 14, wherein the first gas-feed is oriented such that the second jet of fluorine-based gases contacts the silica soot prior to the silica soot being deposited on the bait rod.

19. The apparatus of claim 18, further including:

at least one second gas-feed juxtaposed across the burner from the first gas-feed, the second-gas feed adapted to supply a second jet of fluorine-based gases; and

5 wherein the second gas-feed is oriented such that the second jet of fluorine-based gases contacts the silica soot prior to the silica soot being deposited on the bait rod.

20. The apparatus of claim 14, further including:

10 at least one second gas-feed juxtaposed across the burner from the first gas-feed, the second gas-feed adapted to supply a second jet of fluorine-based gases; and

wherein the second gas-feed is oriented such that the second jet of fluorine-based gases contact the silica soot subsequent to at least a portion of the silica producing gas being vaporized within the reactant flame of the burner.

15 21. The apparatus of claim 14, further including:

at least one second gas-feed juxtaposed across the burner from the first gas-feed, the second gas-feed adapted to supply a second jet of fluorine-based gases; and

20 wherein the second gas-feed is oriented such that the second jet of fluorine-based gases contacts the silica soot prior to the silica soot being deposited on the bait rod.